

VISION RESEARCH

Founded by THORNE SHIPLEY

Chairman and Editor-in-Chief

Dennis M. Levi, School of Optometry, University of California Berkeley, CA 94720-2020, U.S.A.

Vision Research Editorial Office

Vision Research Editorial Office, c/o Elsevier, 525 B Street, San Diego, CA 92101-4495, U.S.A. E-mail: VR@elsevier.com

Vision Research is a journal devoted to the functional aspects of human, vertebrate and invertebrate vision and welcomes papers that address important issues in basic and/or clinical research.

Senior Editors

WOLFGANG BAEHR, Salt Lake City, UT, U.S.A.

DAVID BURR, Pisa, Italy

MICHAEL S. LANDY, New York, NY, U.S.A.

DAVID H. FOSTER, Manchester, U.K.

MARISA CARRASCO, New York, NY, U.S.A.

RICHARD KRAUZLIS, La Jolla, CA, U.S.A.

The Senior Editors are assisted by an Editorial Board consisting of:

DAVID ALAIS, Sydney, Australia

GEOFFREY BOYNTON, La Jolla, CA, U.S.A.

JOCHEN BRAUN, Magdeburg, Germany

ELI BRENNER, Amsterdam, The Netherlands

FRANK BREMMER, Marburg, Germany

KARL GEGENFURTNER, Giessen, Germany

JULIE HARRIS, St. Andrews, Fife, U.K.

DONALD HOOD, New York, NY, U.S.A.

FRED KINGDOM, Montreal, Canada

LYNNE KIORPES, New York, NY, U.S.A.

ILONA KOVACS, Budapest, Hungary

SUSANA MARCOS, Madrid, Spain

PAUL MARTIN, Carlton, Vic., Australia

PAUL MCGRAW, Bradford, U.K.

SHIN'YA NISHIDA, Atsugi, Kanagawa, Japan

ANTHONY NORCIA, San Francisco, CA, U.S.A.

BRUNO OLSHAUSEN, Davis, CA, U.S.A.

MICHAEL PARADISO, Providence, RI, U.S.A.

TATANIA PASTERNAK, Rochester, NY, U.S.A.

AUSTIN ROORDA, Berkeley, CA, U.S.A.

GARY RUBIN, London, U.K.

SCOTT STEVENSON, Houston, TX, USA

SIMON THORPE, Toulouse, France

PREETI VERGHESE, San Francisco, CA, U.S.A.

JOHNATHAN VICTOR, New York, NY, USA

JOSH WALLMAN, New York, NY, U.S.A.

MIKE WEBSTER, Reno, NV, U.S.A.

DAVID WHITNEY, Davis, CA, USA

CONG YU, Beijing, China

Publication information: *Vision Research* (ISSN 0042-6989) is published semimonthly by Elsevier (Radarweg 29, 1043 NX Amsterdam, the Netherlands). Further information on this journal is available from the Publisher or from the Elsevier Customer Service Department nearest you or from this journal's website (<http://www.elsevier.com/locate/visres>). Information on other Elsevier products is available through Elsevier's website (<http://www.elsevier.com>). Periodicals Postage Paid at Rahway, NJ, and at additional mailing offices. USA POSTMASTER: Send change of address to *Vision Research*, Elsevier Customer Service Department, 3251 Riverport Lane, Maryland Heights, MO 63043, USA.

Orders, claims, and journal inquiries: please contact the Elsevier Customer Service Department nearest you: **St. Louis:** Elsevier Customer Service Department, 3251 Riverport Lane, Maryland Heights, MO 63043, USA; phone: (877) 8397126 [toll free within the USA]; (+1) (314) 4478878 [outside the USA]; fax: (+1) (314) 4478077; e-mail: JournalCustomerService-usa@elsevier.com. **Oxford:** Elsevier Customer Service Department, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK; phone: (+44) (1865) 843434; fax: (+44) (1865) 843970; e-mail: JournalsCustomerServiceEMEA@elsevier.com. **Tokyo:** Elsevier Customer Service Department, 4F Higashi-Azabu, 1-Chome Bldg, 1-9-15 Higashi-Azabu, Minato-ku, Tokyo 106-0044, Japan; phone: (+81) (3) 5561 5037; fax: (+81) (3) 5561 5047; e-mail: JournalsCustomerServiceJapan@elsevier.com. **Singapore:** Elsevier Customer Service Department, 3 Killiney Road, #08-01 Winsland House I, Singapore 239519; phone: (+65) 63490222; fax: (+65) 67331510; e-mail: JournalsCustomerServiceAPAC@elsevier.com.

Author inquiries: For inquiries relating to the submission of articles (including electronic submission where available), please visit this journal's homepage at <http://www.elsevier.com/locate/visres>. You can track accepted articles at <http://www.elsevier.com/trackarticle> and set up e-mail alerts to inform you of when an article's status has changed. Also accessible from here is information on copyright, frequently asked questions, and more. For detailed instructions on the preparation of electronic artwork, please visit <http://www.elsevier.com/artworkinstructions>. Contact details for questions arising after acceptance of an article, especially those relating to proofs, will be provided by the publisher.

Advertising information: If you are interested in advertising or other commercial opportunities please e-mail Commercialsales@elsevier.com and your enquiry will be passed to the correct person who will respond to you within 48 hours.

Printed in the United States of America

∞ The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper)

Front cover illustration: see p. 1175.